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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/770,017	01/25/2001	Masayoshi Kobayashi	P/2291-98	5189

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EXAMINER

PHAM, HUNG Q

ART UNIT	PAPER NUMBER
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2172

14

DATE MAILED: 03/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/770,017

Applicant(s)

KOBAYASHI, MASAYOSHI

Examiner

HUNG Q PHAM

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6,7,9,10,12-14,16-22 and 24-29 is/are rejected.
- 7) ☒ Claim(s) 8,11,15 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 13.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/09/2004 has been entered.

The pending claims are 6-29.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 12 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Powers et al. U.S.P 5,404,513].

Regarding to claim 12, Powers teaches a method for organizing data to be accessed by a digital computer. As shown in FIG. 1, the secondary storage 14 is *a memory storing a data structure* comprises a plurality of tables and a summary

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tree. As shown in FIG. 3, a summary tree as *an assumed tree structure that includes all of the items of data are stored for search*. As shown in FIG. 5 is a technique for eliminating redundancy by sharing a sub-tree of the summary tree if possible. As disclosed by Powers, in the summary tree, a summary node representing the same set of records appears in several places of the tree, depending on the order of dimensions used to access it. For instance, the summary node 120 representing the set of records with dimension field SEX having value M and dimension field ZIPCODE having value 02046 is in a different part of the tree than the summary node representing records with dimension field ZIPCODE having value 02046 and dimension field SEX having value M (Col. 6, Lines 3-16). As seen, the rebuilt summary tree as *a tree structure in which the items of data are stored except for the summary node representing records with dimension field ZIPCODE having value 02046 and dimension field SEX having value M as a portion of the items of data corresponding to a sub-tree of the assumed tree structure, which is a selected portion of the assumed tree structure*. As shown in FIG. 6, is the structure of a summary node as *an equivalent table storing at least a portion of the items of data included in the selected sub-tree structure in a table form* (FIG. 6, Col. 5, Lines 32-38). Powers further discloses *a search section for searching the data structure for and item of data matching input search data* (Col. 2, Lines 26-32).

Regarding to claim 16, Powers teaches a method for organizing data to be accessed by a digital computer. As shown in FIG. 3 is a summary tree as *an*

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assumed tree structure. As shown in FIG. 5 is a technique for eliminating redundancy by sharing a sub-tree of the summary tree if possible. As disclosed by Powers, in the summary tree, a summary node representing the same set of records appears in several places of the tree, depending on the order of dimensions used to access it. For instance, the summary node 120 representing the set of records with dimension field SEX having value M and dimension field ZIPCODE having value 02046 is in a different part of the tree than the summary node representing records with dimension field ZIPCODE having value 02046 and dimension field SEX having value M (Col. 6, Lines 3-16). As seen, the rebuilt summary tree as *a tree structure in which the items of data are stored except for* the summary node representing records with dimension field ZIPCODE having value 02046 and dimension field SEX having value M as *a portion of the items of data corresponding to a sub-tree of the assumed tree structure, which is a selected portion of the assumed tree structure.* As shown in FIG. 6, is the structure of a summary node as *an equivalent table storing the selected portion of the items of data in table form* (FIG. 6, Col. 5, Lines 32-38).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. [USP 5,404,513] in view of Applicant Admitted Prior Art [Specification, pages 1-5].

Regarding to claim 17, Powers teaches all the claimed subject matters as discussed in claim 16, Powers further discloses *the tree structure includes a plurality of pointers each corresponding to predetermined branches and related information, wherein each of the pointers indicates one of its child node, the equivalent table, the equivalent table includes related information*, but fails to disclose *a node information flag, NULL pointer, a table node information flag, a tail entry flag, a data bit string, a search bit length*. Applicant Admitted Prior Art teaches a tree structure includes *a node information flag, NULL pointer*. As shown in Powers FIG. 6 is the structure of summary node in the form of table. Obviously, data information such as *a table node information flag, a tail entry flag, a data bit string, a search bit length* could be stored in this table. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Powers technique by using the summary tree and summary node for storing *node information flag, NULL pointer, table node information flag, tail entry flag, data bit string, search bit length* in order to process the summary tree.

Regarding to claim 18, Powers and Applicant Admitted Prior Art teaches all the claimed subject matters as discussed in claim 17, Applicant Admitted Prior

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Art further discloses *the data bit string is arranged so that a length of the data bit string is equal to that of search data, wherein the search bit length indicates a length of an original bit string to match with the search data* (Applicant Admitted Prior Art, page 2, Lines 3-9).

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. [USP 5,404,513] in view of Applicant Admitted Prior Art [Specification, pages 1-5] and Doerenberg et al. [USP 6,467,003 B1].

Regarding to claim 19, Powers and Applicant Admitted Prior Art teaches all the claimed subject matters as discussed in claim 17, but fails to disclose: *the entries in the equivalent table are stored at consecutive locations in a memory.*

Doerenberg teaches the technique of storing the entries of the table at consecutive locations in a memory (Doerenberg, Col. 16, Lines 28-33). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Powers and Applicant Admitted Prior Art technique by storing the entries at consecutive locations in a memory in order to save the memory when processing the summary tree.

Claims 6, 9, 13, 21 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. [USP 5,404,513].

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Regarding to claims 6, 9, 13, 21, 28, Powers teaches a method for organizing data to be accessed by a digital computer. As shown in FIG. 3, a summary tree as *an assumed tree structure in which all the items of data are stored is formed*. As shown in FIG. 5 is a technique for eliminating redundancy by sharing a sub-tree of the summary tree if possible. As disclosed by Powers, in the summary tree, a summary node representing the same set of records appears in several places of the tree, depending on the order of dimensions used to access it. For instance, the summary node 120 representing the set of records with dimension field SEX having value M and dimension field ZIPCODE having value 02046 is in a different part of the tree than the summary node representing records with dimension field ZIPCODE having value 02046 and dimension field SEX having value M (Col. 6, Lines 3-16). As seen, the summary node and its sub-tree representing records with dimension field ZIPCODE having value 02046 and dimension field SEX having value M or *predetermined conditions* is sequentially selected as the step of *sequentially selecting a node from the assumed tree structure to select a sub-tree structure including the selected node and any child nodes of the selected node* and *determining whether the selected sub-tree structure satisfies one or more predetermined conditions*. As shown in FIG. 6, is the structure of a summary node for *storing at least a portion of the items of data included in the selected sub-tree structure in a table form* (FIG. 6, Col. 5, Lines 32-38). As shown in FIG. 5, the selected summary node with dimension field ZIPCODE having value 02046 and dimension field SEX having value M is replaced by summary node 120, which has the structure of a table to rebuild the summary tree, the rebuilt

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summary tree as a data structure. In different words, the technique as discussed performs the step of *replacing the selected sub-tree structure with a summary node to construct the data structure, when the selected sub-tree structure satisfies the one or more predetermined conditions*. Powers does not explicitly teach *an equivalent table* for storing at least a portion of the items of data included in the selected sub-tree structure in a table form. However, as taught by Powers, a child summary node can be represented using a two-dimensional table as *an equivalent table* for storing at least a portion of the items of data (Col. 6, Lines 30-31). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Powers method by using a table to represent a summary node in order to reduce the memory of a summary tree.

Claim 7, 10, 14, 20, 22, 24-27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Powers et al. [USP 5,404,513] and further in view of Jeffries [USP 6,633,879 B1].

Regarding to claims 20, 24-27 and 29, Powers teaches all the claimed subject matters as discussed in claims 16, 6, 9, 13, 21 and 28, but does not explicitly teach *the predetermined conditions are that: 1) an amount of memory required to store a data structure including the equivalent table in place of the selected sub-tree structure is smaller than that required to store the assumed tree structure; and 2) search performance of the data structure is not lower than that of the assumed tree structure*. However, as taught by Powers, the summary tree is rebuilt to eliminate

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redundancy by sharing the summary node for reducing the duplication (Powers, Col. 6, Lines 3-16). Obviously, instead of using two nodes, only one summary node is used, and *an amount of memory required to store a data structure including the equivalent table in place of the selected sub-tree structure is smaller than that required to store the assumed tree structure*. Jeffries teaches a method for determining a maximum search time (Jeffries, Col. 9, Lines 23-45). As seen, the Jeffries maximum search time could be used as a threshold to determine the access time for the rebuilt summary tree. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Powers method by including the technique of reducing the memory and access time in order to rebuild the summary tree.

Regarding to claims 7, 10, 14, 22, Powers teaches all the claimed subject matters as discussed in claims 24, 25, 26, 27, but does not explicitly teach *the selected sub-tree structure is replaced with the equivalent table to form a new data structure, a necessary amount of memory for the new data structure is smaller than that for the assumed tree structure and the selected sub-tree structure is replaced with the equivalent table to form a new data structure, a maximum search time T_{max_t} calculated from the new data structure does not exceed a maximum search time T_{max} calculated from the assumed tree structure*. However, as taught by Powers, the summary tree is rebuilt to eliminate redundancy by sharing the summary node for reducing the duplication (Powers, Col. 6, Lines 3-16). Obviously, instead of using two nodes, only one summary node is used, *a necessary amount of memory for the*

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new data structure is smaller than that for the assumed tree structure. Jeffries teaches a method for determining a maximum search time (Jeffries, Col. 9, Lines 23-45). As seen, the Jeffries maximum search time could be used as a threshold to determine the access time for the rebuilt summary tree. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Powers method by including the technique of reducing the memory and access time in order to rebuild the summary tree.

Allowable Subject Matter

4. Claims 8, 11, 15 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding to claims 8, 11, 15 and 23, Powers and Jeffries also teaches a method for controlling storage and retrieval of data. However, Powers and Jeffries fails to teach or suggest *a decision on whether the condition (1) is satisfied is made depending whether the following equation is satisfied:*

$$N_D \leq N_L \times K, \text{ when } K = T_e / T_n$$

where N_D is the number of items of data included in the selected sub-tree structure, N_L is the number of levels of selected node or lower in the assumed tree structure, T_n is search time per node, and T_e is search time per entry in the equivalent table.

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Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG Q PHAM whose telephone number is 703-605-4242. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BREENE can be reached on 703-305-9790. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner Hung Pham
March 8, 2004


SHAHID ALAM
PRIMARY EXAMINER